REMARKS

Claims 9-18 remain in this application.

Claims 9-18 stand rejected as obvious over YAMAMOTO 5,811,958 in view of KINOSHITA 6,157,165.

Applicant respectfully disagrees.

KINOSHITA

A review of KINOSHITA may be helpful. KINOSHITA discloses reducing voltage or current ripples in unit batteries within a battery apparatus. KINOSHITA does not disclose a specific method or system for charging batteries. In KINOSHITA, the storage capacitor 111 is charged from unit battery 101, and then is discharged in adjacent unit battery 101b, as disclosed in column 8, lines 29-55. Thus, the storage capacitor 111 is not charged from a direct-current source which would be distinct from a battery.

In KINOSHITA, the storage capacitor 104 is submitted to a plurality of charging steps until reaching a voltage equal the voltage of a unit battery 101a (Figure 2, column 8, lines 29-55). Then, the energy stored in capacitor is transferred into capacitor 111 and further into adjacent unit battery 101b. This globally corresponds to energy transfers between unit batteries within a battery apparatus, but not a battery charging process from a direct-current source. KINOSHITA teaches how balancing voltages between the battery cells by transferring energy between

said battery cells through a set of two capacitors which are selectively connected to each unit battery by switching means 103 (Figure 6).

Note that in KINOSHITA capacitors 111 and 104 are designed and sized for a state of charge balancing function but not for a battery charging function as recited in pending claims 9 and 12. The function of capacitors 111 and 104 is intrinsically different from the function of the capacitor employed in the claimed invention.

YAMAMOTO

YAMAMOTO discloses charging a battery 9 from a direct-current source 1. However, as acknowledged by the Official Action, YAMAMOTO does not disclose the recited step of "detecting a predetermined voltage threshold over the terminals of said storage capacitor." It follows that YAMAMOTO also does not disclose the recited step of "upon detection of said voltage threshold, connecting said storage capacitor to said battery during a predetermined time, so as to transfer energy from said storage capacitor into said battery".

The Official Action states that YAMAMOTO discloses monitoring voltage over the terminals of a storage capacitor (figure 5, items b-d disclose a voltmeter).

Applicant disagrees.

Figure 5 does not disclose monitoring voltage over the terminals of a storage capacitor. See column 8, beginning at line 37. Figure 5a illustrates charging a Ni-Cd battery caused from the discharge current from the electric double layer battery.

Figures 5b-5d show charging circuits with a voltmeter applied over the terminals of the battery being charged. However, there is no disclosure of monitoring voltage of the terminals of a storage capacitor.

Indeed, there is no disclosure in YAMAMOTO of a storage capacitor. The Official Action indicates the YAMAMOTO discloses applying a higher DC voltage to the terminals of a storage capacitor, so as to transfer energy into said storage capacitor, offering column 5, lines 52- column 6, line, 6.

Capacitor 7 is not a storage capacitor but is only a capacitor for removing alternating current (column 5, line 2 and lines 65-66).

Column 5, lines 52- column 6, line, 6 discloses the general operation of the YAMAMOTO converter, but does not disclose a storage capacitor. YAMAMOTO transfer energy from the secondary "capacitor type" battery 3 into the last stage secondary battery 8 with the capacitor removing any alternating current immediately prior to the last stage secondary battery 8. The battery 3 has a bell shape voltage curve and supplies energy

within a range of 3 V - 17 V. The DC-Dc converter supplies power to the last stage battery over the diode 5, capacitor 7 eliminating any alternating current. But there is no teaching of applying a higher DC voltage to the terminals of a storage capacitor so as to transfer energy into said storage capacitor.

Further, as acknowledged by the Official Action, YAMAMOTO does not disclose the recited step of "detecting a predetermined voltage threshold over the terminals of said storage capacitor." It follows that YAMAMOTO also does not disclose the recited step of "upon detection of said voltage threshold, connecting said storage capacitor to said battery during a predetermined time, so as to transfer energy from said storage capacitor into said battery".

KINOSHITA, column 14, lines 42-61, is offered for the steps of "detecting a predetermined voltage threshold over the terminals of said storage capacitor" and "upon detection of said voltage threshold, connecting said storage capacitor to said battery during a predetermined time, so as to transfer energy from said storage capacitor into said battery".

This modification does not make sense.

A main difference between D1 and the invention is that YAMAMOTO does not disclose monitoring a voltage threshold which is measured over the terminals of the storage capacitor and

connecting said capacitor to a battery during a predetermined time.

The inventive technical effect produced by monitoring a voltage threshold which is measured over the terminals of the storage capacitor enables a step charging of the storage capacitor until said voltage threshold is reached no matter how the direct-currently source fluctuates. After that, the connection of said capacitor to a battery during a predetermined time enables a stable charge of said battery thanks to the property of the capacitor according to which the time to charge a capacitor is essentially proportional to the incoming light flow (in case where the direct-current source is a photovoltaic cell panel), whereas the discharge control pulse duration and amplitude remain substantially stable. Therefore, one will understand that the monitoring of a voltage threshold in the invention is associated with the use of a storage capacitor which is itself associated with the issue of a stable charge of a battery from a source liable to significant fluctuations. The element of YAMAMOTO can be associated with the storage capacitor of the invention is the constant voltage battery which is not a capacitor but for example a Ni-Cd or lithium battery or the like (column 3, lines 53-54).

Consequently, it is believed that the distinctive features provide claims 9 and 12 of the invention with novelty and non-obviousness over YAMAMOTO.

KINOSHITA discloses 9see Fig. 7) the measure of the voltage between the terminals of a battery row (101) in order to monitor a charging and discharging control converter (704). The aim of the voltage threshold is to stop an operation that permits the batteries to supplement a commercial power supply (701) and solar-electric power generator (702) or to be charged up when less electric power is consumed by loads (703). This enables one to reduce the cost of equipment and of operation. The issue is not the same as the one of the invention. The voltage threshold according to KINOSHITA is not measured over the terminals of a capacitor and the aim is not to have a stable charge of a battery from a source which is liable to significant fluctuations.

KINOSHITA also discloses (see Fig. 1) a capacitor (111) charged by the unit battery (101a). Said capacitor (111) then charges a second capacitor (104). KINOSHITA discloses monitoring a voltage threshold over the terminals of the capacitor (104) in order to detect when an electric potential difference is reduced below a reference value (column 8, lines 56-60 and column 9, lines 25-29). The detection of said threshold causes the driver (107) to switch from the unit battery (101a) to another unit battery (101b). If the voltage of the capacitor (111) is higher

than the voltage of the other unit battery (101b), the capacitor (111) discharges to the other unit battery (101b). Therefore, said detection does not control the charge of a battery from a direct-current source distinct from a battery, but the charge of a battery (101b) from a battery (101a). Here again, the aim is not to have a stable charge of a battery from a source which is liable to significant fluctuations.

Therefore, at the time the invention was made, a combination of YAMAMOTO with KINOSHITA, by a person having ordinary skill in the art, would not lead to the subject matter as a whole defined in claim 1.

Consequently, the invention is non-obvious with regard to cited prior art.

In that the independent claims are both novel and non-obvious, both the independent claims and the claims depending therefrom are patentable.

Reconsideration and allowance of all the claims are respectfully requested.

This response is believed to be fully responsive and to put the case in condition for allowance. An early and favorable action on the merits is earnestly requested.

Should there be any matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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